BREAD-IGC Virtual PhD Course on Firms
Lecture 3 - Management and Business Training

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Outline

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- **I. Management**
  - **I.1. Introduction and measurement**
  - I.2. Impact of management on firm outcomes
- II. Business training
  - II.1. Traditional small-business training
  - II.2. Alternative approaches to training
- III. Summary

I.1. Introduction and measurement

- Large persistent productivity spread across firms and countries
  - Especially big in developing countries: ratio of the 90th to the 10th percentiles of TFP is 5 in India and 4.9 in China (Hsieh and Kelnow (2009))
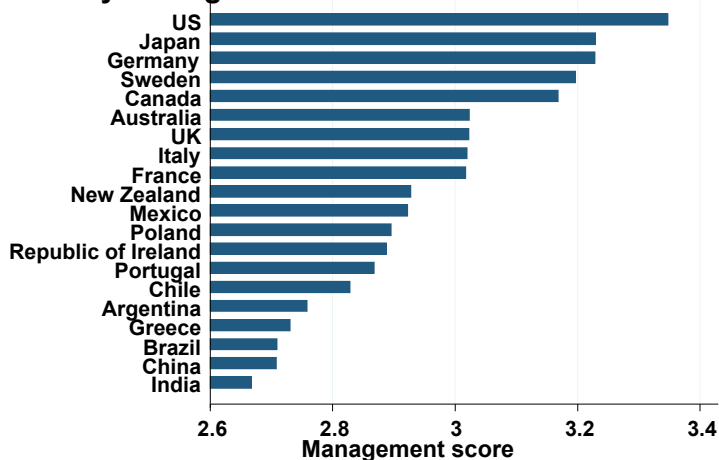
I.1. Introduction and measurement

- Large persistent productivity spread across firms and countries
  - Especially big in developing countries: ratio of the 90th to the 10th percentiles of TFP is 5 in India and 4.9 in China (Hsieh and Kelnow (2009))
- Many people claim this is due to differences in "management"
  - Country level management scores are correlated with GDP
  - Firm management spreads look like TFP spreads

One motivation for looking at management is that country management scores are correlated with GDP

Random sample of manufacturing population firms 100 to 5000 employees.
Source: Bloom and Van Reenen (2007, QJE) and Bloom and Van Reenen (2010, JEP)

- But there is a wide debate:
  - Firms make optimal choices about management practices
    - Another factor of production
    - No "better" or "worse" style of management: depends on firm's circumstances
  - Complexity of the phenomenon of management makes it hard to measure

I.1. Introduction and measurement

Measuring Management: Bloom and Van Reenen (2007)

- Develop a survey tool to "measure" management practices
  - 732 firms in US,UK, France and Germany, median size 600

1) Developing management practice scoring

- Scorecard for 18 monitoring, targets and incentives practices
- 45 minute phone interview of (manufacturing plant) managers

2) Obtaining unbiased responses

- "Double-blind"
  - Interviewers do not know company performance
  - Managers are not informed (in advance) they are scored

3) Getting firms to participate in the interview

- Introduced as "Lean-manufacturing" interview, no financials
- Endorsement of Bundesbank ,UK Treasury, Banque de France
- Run by 10 MBAs (loud, assertive & business experience)

Measuring Management: Bloom and Van Reenen (2007)

MONITORING - i.e. "*HOW IS PERFORMANCE TRACKED*?"

Score	(1): Measures tracked do not indicate directly if overall business objectives are being met. Certain processes aren't tracked at all	(3): Most key performance indicators are tracked formally. Tracking is overseen by senior management	(5): Performance is continuously tracked and communicated, both formally and informally, to all staff using a range of visual management tools

Measuring Management: Bloom and Van Reenen (2007)

INTERVAL VALIDATION OF THE SCORING

• Re-interviewed 64 firms with different interviewers *and* managers

Firm average scores (over 18 question)
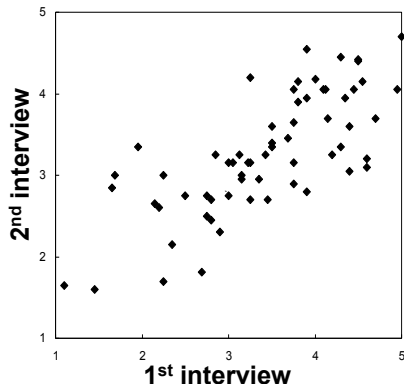
• <u>Firm-level average</u> correlation of 0.759

Y-axis: 2nd interview (1 to 5)
X-axis: 1st interview (1 to 5)

Measuring Management: Bloom and Van Reenen (2007)

EXTERNAL VALIDATION OF THE SCORING

Performance measure   country c

$$y_{it}^c = \beta MNG_i^c + \alpha^c{}_l l_{it}^c + \alpha^c{}_k k_{it}^c + \alpha^c{}_m m_{it}^c + \gamma^c{}' x_{it}^c + u_{it}^c$$

management (average z-scores)   ln(labor)   ln(capital)   ln(materials)   other controls

- Use up to 11 years of accounting data for 1994-2004

- Note – **not a causal estimation**, only an association

I.1. Introduction and measurement

Measuring Management: Bloom and Van Reenen (2007)

Dependent variable	Sales (in Ln)	Sales (in Ln)	Sales (in Ln)	ROCE	Tobin Q (in Ln)	Sales growth	Exit
Estimation[1]	OLS	OLS	OLS	OLS	OLS	OLS	Probit
Firms	All	All	All	All	Quoted	All	All
Management$_i$	0.085 (0.025)	0.034 (0.011)	0.042 (0.012)	2.469 (0.688)	0.250 (0.075)-	0.018 (0.006)	-0.200 [0.026]
Ln(Labor)$_{it}$	0.999 (0.014)	0.539 (0.021)	0.540 (0.021)	2.172 (1.202)	0.209 (0.109)	-0.022 (0.011)	0.233 [0.045]
Ln(Capital)$_{it}$		0.103 (0.013)	0.104 (0.013)	-0.148 (0.899)	-0.029 (0.086)	0.024 (0.008)	-0.158 [0.045]
Ln(Materials)$_{it}$		0.362 (0.020)	0.354 (0.020)	-0.439 (0.723)	0.130 (0.050)	-0.010 (0.007)	-0.084 [0.231]
Controls[1]	No	Yes	Yes	Yes	Yes	Yes	Yes
Noise controls	No	No	Yes	Yes	Yes	Yes	Yes
Observations	6,267	5,350	5,350	5,089	2,635	4,777	709
Firms	732	709	709	690	374	702	709

Outline

I.2. Bloom et al (2013)

Overview:

- The first experiment to evaluate the impact of modern management practices on TFP
- Experiment on 20 plants in large multi-plant firms (average 300 employees and 7m dollars sales) near Mumbai making cotton fabric
- Randomized treatment plants get 5 months of management consulting intervention, controls get 1 month
- Collect weekly data on all plants from 2008 to 2010

I.2. Bloom et al (2013)

Design:

- Consulting is on 38 specific practices tied to factory operations, quality and inventory control
- The consulting treatment has three phases:
  - Diagnostic phase:
    - One month, both treatment and control
    - Evaluate the current management practices of each plant

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    - Implementation phase:
        - Four months, only treatment
        - Introduce key management practices and persuade firms to adopt

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    - Measurement phase:
        - Collection of performance and management data from all treatment and control plants

I.2. Bloom et al (2013)

Design:

- 5 areas of management:
  - Factory operations:
    - Regular maintenance of machines and recording the reasons for breakdowns to learn from failures
    - Keep the factory floor tidy to reduce accidents and facilitate the movement of materials
    - Establish standard procedures for operations
  - Quality control:
    - Record quality problems by type, analyzing these records daily
    - Formaliz procedures to address defects to prevent their recurrence
  - Human resources management:
    - Performance-based incentive systems for workers and managers
    - Job descriptions defined for all workers and managers

I.2. Bloom et al (2013)

Design:

- 5 areas of management (continued):
  - Inventory:
    - Record yarn stocks on a daily basis
    - Yarn sorted, labeled, and stored in the warehouse by type and color
    - Log information onto a computer
  - Sales and order management:
    - Track production on an order-wise basis to prioritize customer orders by delivery deadline
    - Use design-wise efficiency analysis so pricing can be based on actual (rather than average) production costs

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Sample:

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- 34 expressed an interest in the project
- 17 agreed to commit senior management time to the consulting program

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    - Downward bias if firms with the most to gain from improvement are also the most skeptical of what consultants can do

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    - Upward bias if firms with more to gain are more likely to participate
    - Downward bias if firms with the most to gain from improvement are also the most skeptical of what consultants can do
  - However, still policy relevant because typical policy to offer management training to firms will also rely on firms volunteering to participate

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Small sample problem:

- Small sample because this is expensive! (75K per treated plant), why also no prior large-firm management experiments
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    - Data from machines and logs so little measurement error
    - High frequency data: 114 weeks of data

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    - High frequency data: 114 weeks of data
- Need to use appropriate statistical inference:
    - Use bootstrap firm clustered standard errors as baseline
    - Also use permutation tests (12,376 possible ways of choosing 11 treated from 17 firms) to get test statistics which don't rely on asymptotics
    - Use large T-asymptotics from Ibramigov-Mueller (2009)
        - Remove time effects
        - Estimate parameter of interest separately for each treatment firm
        - Provides robustness to heterogeneity across firms
    - All three methods give similar results

Adoption of the 38 management practices over time
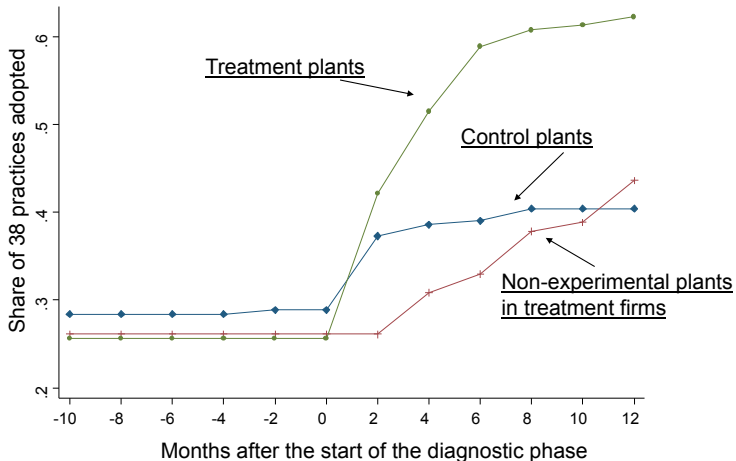
I.2. Bloom et al (2013)

Estimations:

- Quality: Measured by Quality Defects Index (QDI) - a weighted average of quality defects (higher if worse quality)
- Inventory: Measured in log tons
- Output: Production picks
- Productivity: $Log(VA) - 0.42 * log(K) - 0.58 * log(L)$
- Regression:
  $Outcome_{it} = \alpha Treatment_{it} + c_t + d_i + e_{it}$

Intention to Treat estimations

Dep. Var.	Quality Defects$_{i,t}$	Inventory$_{i,t}$	Output$_{i,t}$	TFP$_{i,t}$
Intervention$_{i,t}$	-0.565*** (0.231)	-0.273** (0.116)	0.098*** (0.036)	0.169** (0.067)
Small sample robustness Ibragimov-Mueller (95% Conf. Intervals)	[-0.782, -0.441]	[-0.219, 0.001]	[0.218, 0.470]	[0.183, 0.511]
Permutation Test (p-values)	0.04	0.13	0.04	0.05
Time FEs	125	122	125	122
Observations	1396	1627	1966	1447

OLS and IV estimations

$$\text{OUTCOME}_{i,t} = \alpha_i + \beta_t + \theta\text{MANAGEMENT}_{i,t} + \nu_{i,t}$$

Dep. Var.	Quality Defects	Quality Defects	Invent.	Invent.	Output	Output	TFP	TFP
Specification	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Management$_{i,t}$	-0.561 (0.440)	-1.675** (0.763)	-0.639*** (0.242)	-0.921*** (0.290)	0.127 (0.099)	0.320** (0.118)	0.160 (0.179)	0.488** (0.227)
1st stage Fstat		67.51		63.76		91.20		74.68
Time FEs	113	113	113	113	114	114	113	113
Plant FEs	20	20	18	18	20	20	20	20
Observations	1732	1732	1977	1977	2312	2312	1779	1779

Why don't firms improve themselves?

- Common practices: firms had heard of the practices but thought they would not be profitable to adopt
- Uncommon practices: lack of information about their existence

I.2. Bloom et al (2013)

Why doesn't competition fix badly managed firms?

- Decentralization appears limited:
  - Owners take all decisions as they worry about managers stealing but are time constrained (72.4 hours a week)
  - Only members of the owning family had positions with any real decision-making power
  - A key reason is the weak rule of law in India
  - As a result firm size is more linked to number of male family members than management scores: limiting growth
  - Unproductive firms are likely able to survive because more productive firms cannot expand
- Entry is limited for the same reason

I. Management

- What we have learned so far:
    - Large heterogeneity in management practices
    - Better managed firms perform better (Bloom and Van Reenen 2007)
    - Management practices can be improved, with positive effects (Bloom et al 2012)

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  - Better managed firms perform better (Bloom and Van Reenen 2007)
  - Management practices can be improved, with positive effects (Bloom et al 2012)
- Most of the urban labor force in low-income countries is employed in much smaller enterprises with fewer than 5 workers
- Does management matter for them?

I. Management

- Management practices for small firms:
  - Separating household and business accounts
  - Monitoring inventory
  - Record Keeping
  - Financial Planning
  - Marketing

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- Management practices for small firms:
    - Separating household and business accounts
    - Monitoring inventory
    - Record Keeping
    - Financial Planning
    - Marketing
- Small firms using better management practices are more productive and grow faster (McKenzie and Woodruff 2017)
- However, many firms fail to adopt better management practices
- A popular approach: business training

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II. Business training

- At least 1 billion USD is spent annually on business training in developing countries
- A majority of training programs are offered to microentrepreneurs
  - **Traditional small business training**
  - Heuristics and rule-of-thumb
  - Training on aspirations and mind-set
- Does training improve business outcomes?
- How to improve the training programs?

II.1. Traditional small-business training

- Classroom-based training in basic business practices
- A trainer teaching a group of 15 to 40 participants in 3-12 days
- Topics for porential entrepreneurs: generating business ideas, developing a business plan, costing, pricing, budgeting
- Topics for existing firms: record keeping, accounting, marketing, hiring, stock and inventory management, planning
- A large number of evaluations on this type of training

II.1. Traditional training: de Mel et al (2014)

- Conduct randomized experiments in Sri Lanka to test impact of business training
- Use the ILO's SIYB training program, which is the most commonly used worldwide

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- Conduct randomized experiments in Sri Lanka to test impact of business training
- Use the ILO's SIYB training program, which is the most commonly used worldwide
- Key novelty in design:
  - Sample not only include existing business but also potential entreprenuers
  - Look at impact of training alone, as well as training + grants
  - Measure outcomes at 4 points in time post-training: increases power and look at trajectories

Impact on business practices of current enterprises:

Table 3: Impact on Business Practices of Current Enterprises

	Total Practices Score				Marketing	Stock Control	Record keeping	Financial Planning
	Round 2	Round 4	Round 5	All rounds	All rounds	All rounds	All rounds	All rounds
Intent-to-Treat Effects								
Assigned to Cash if finish Training	2.530***	1.936***	2.109***	2.087***	0.379***	0.230***	0.872***	0.628***
	(0.555)	(0.567)	(0.570)	(0.326)	(0.109)	(0.0603)	(0.154)	(0.132)
Assigned to Training only	1.719***	1.708***	1.075*	1.524***	0.433***	0.125**	0.483***	0.535***
	(0.555)	(0.560)	(0.568)	(0.326)	(0.113)	(0.0638)	(0.148)	(0.140)
Treatment on the Treated								
Received Training & Cash	3.588***	2.790***	3.122***	3.059***	0.552***	0.338***	1.281***	0.917***
	(0.591)	(0.607)	(0.631)	(0.429)	(0.147)	(0.0819)	(0.204)	(0.174)
Received Training Only	2.192***	2.261***	1.489***	2.031***	0.574***	0.167**	0.645***	0.711***
	(0.540)	(0.546)	(0.580)	(0.389)	(0.136)	(0.0783)	(0.178)	(0.168)
Observations	544	513	506	1,563	1,563	1,563	1,563	1,563
Firms	544	513	506	573	573	573	573	573
p-value for testing two treatments equal	0.154	0.690	0.080	0.099	0.622	0.091	0.011	0.533
Baseline Mean:	4.96	5.02	4.98	4.96	1.66	0.53	2.10	0.64

Real Profits for Current Firms over Time
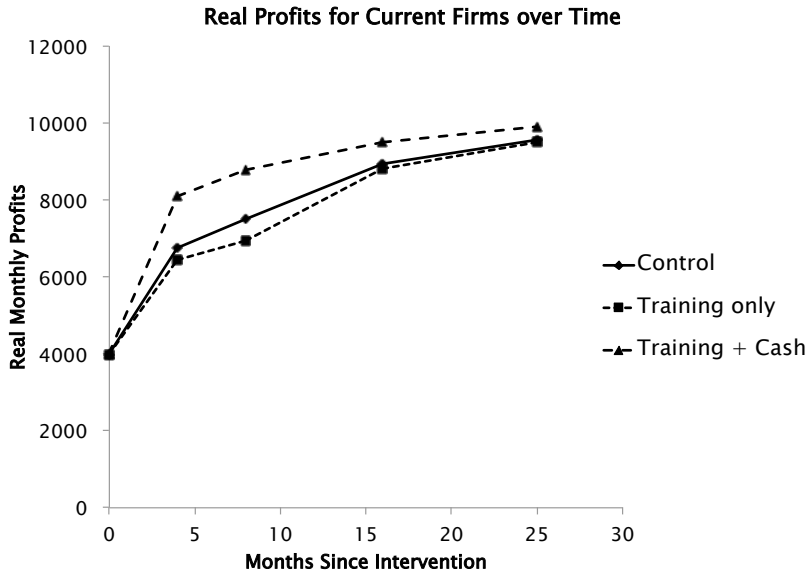
de Mel et al (2014) results are typical of much of the evaluations:

- Significant improvements in some measures of business practices
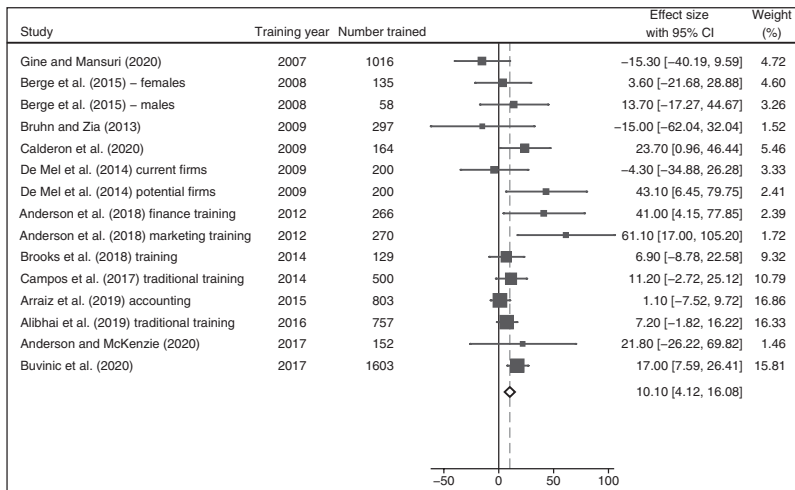- No significant impact on sales or profit

McKenzie (2020):

Study	Training year	Number trained		Effect size with 95% CI	Weight (%)
Karlan and Valdivia (2011)	2002	2732		–0.10 [–10.68, 10.48]	18.07
Drexler et al. (2014) accounting	2007	402		–7.80 [–26.03, 10.43]	6.09
Gine and Mansuri (2020)	2007	1016		–24.90 [–54.30, 4.50]	2.34
Berge et al. (2015) – females	2008	135		–0.50 [–26.76, 25.76]	2.93
Berge et al. (2015) – males	2008	58		13.00 [–21.30, 47.30]	1.72
Calderon et al. (2020)	2009	164		28.80 [4.89, 52.71]	3.54
De Mel et al. (2014) current firms	2009	200		–13.60 [–67.89, 40.69]	0.69
De Mel et al. (2014) potential firms	2009	200		40.90 [–5.75, 87.55]	0.93
Valdivia (2015)	2009	711		12.20 [–8.77, 33.17]	4.60
Anderson et al. (2018) finance training	2012	266		25.30 [–5.86, 56.46]	2.08
Anderson et al. (2018) marketing training	2012	270		64.40 [17.75, 111.05]	0.93
Chong and Velez (2020)	2013	568		35.80 [–4.58, 76.18]	1.24
Brooks et al. (2018) training	2014	129		3.30 [–11.60, 18.20]	9.12
Campos et al. (2017) traditional training	2014	500		5.60 [–11.06, 22.26]	7.29
Arraiz et al. (2019) accounting	2015	803		3.60 [–4.04, 11.24]	34.65
Alibhai et al. (2019) traditional training	2016	757		–0.90 [–27.16, 25.36]	2.93
Anderson and McKenzie (2020)	2017	152		20.70 [–28.89, 70.29]	0.82
				4.67 [0.17, 9.17]	

II.1. Traditional small-business training

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Gine and Mansuri (2020)	2007	1016	−15.30 [−40.19, 9.59]	4.72
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Berge et al. (2015) – males	2008	58	13.70 [−17.27, 44.67]	3.26
Bruhn and Zia (2013)	2009	297	−15.00 [−62.04, 32.04]	1.52
Calderon et al. (2020)	2009	164	23.70 [0.96, 46.44]	5.46
De Mel et al. (2014) current firms	2009	200	−4.30 [−34.88, 26.28]	3.33
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Arraiz et al. (2019) accounting	2015	803	1.10 [−7.52, 9.72]	16.86
Alibhai et al. (2019) traditional training	2016	757	7.20 [−1.82, 16.22]	16.33
Anderson and McKenzie (2020)	2017	152	21.80 [−26.22, 69.82]	1.46
Buvinic et al. (2020)	2017	1603	17.00 [7.59, 26.41]	15.81
			10.10 [4.12, 16.08]	

II.1. Traditional small-business training

McKenzie (2020):

- Estimates a random effects meta-analysis
- Training has a significant positive average effect on both profit (10.1%) and sales (4.7%)

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McKenzie (2020):

- Estimates a random effects meta-analysis
- Training has a significant positive average effect on both profit (10.1%) and sales (4.7%)
- Why doesn't traditional training have a larger effect?
    - Low adoption rate of practices after training
    - Quality of training and selection of participants

Open questions:

- How to improve targeting?

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  - Simple screening/community/machine learning/price?

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- How to improve targeting?
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- Moving to market solutions:
    - All these existing RCTs have given training away for free, or charged a token price
    - But many issues with this:
        - Sustainability of training
        - Potential crowd-out of market providers
        - Role of price as a screening mechanism: do those with higher willingness to pay have higher returns?
        - If we just gave people cash, would they spend it on training?

II.1. Traditional small-business training

Work just starting in Jamaica and Mexico:

WTP cumulative distribution

Cost of Course

Willingness to Pay in J$

Basic — Credit — Discount Frame
Discount Frame and Credit
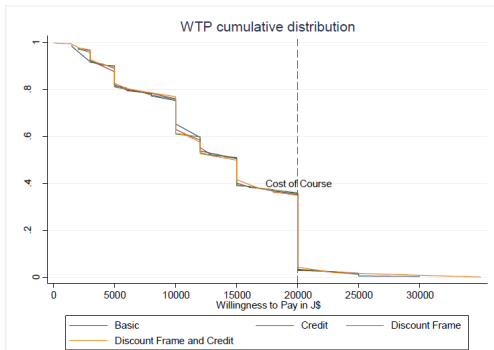
Want to elicit Willingness to Pay for Train; and then randomize price people actually pay

Measure whether, at a given price paid, those with higher WTP have higher returns to training

Lots of logistic issues in implementing this (and in part in just getting organizations used to giving away stuff to start taking payments)

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- Limitations of traditional training:
  - The adaptability of the content to individual businesses
    - Mentoring and peer interaction approaches
  - Costly to deliver training in classroom settings, inconvenient for entreprenuers to attend
    - Alternative delivery mechanisms: online training, SMS messages, and voice messages

II.2. Alternative approaches to training

Peer mentoring: Brooks et al (2018)

- Field experiment in Kenyan slum with young, female microenterprises
    - Randomly assigned to meet with successful local business owner
    - Twice as profitable, 10 years more experience
    - For comparison: standard business training class, control group
- Specific questions:
    - Does interaction increase profit? For who?
    - Is it better than in-class training?
    - What channels do each work through?

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- Key novelty
  - Format of training
  - Content: formal business class vs. market specific info

II.2. Alternative approaches: Brooks et al (2018)

Design:

- 378 business owners randomized into one of three groups:
    - Control: 3500 Ksh to participate (two weeks average profit)
    - Classes
    - Assigned to meet with successful local business owner (mentor)

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- Class treatment:
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    - Course on microenterprise skills and developments: marketing, pricing, business plans
    - Two hour classes each week, 4 weeks

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  - Taught by experienced faculty from Strathmore University in Nairobi
  - Course on microenterprise skills and developments: marketing, pricing, business plans
  - Two hour classes each week, 4 weeks
- Mentorship treatment:
  - Mentees told to meet with mentor weekly for four weeks
  - Mentor chosen to match mentee business type
  - Conditional on business type, randomly assigned
- Six monthly follow-ups

II.2. Alternative approaches: Brooks et al (2018)

Main findings:

- Big short-term effect of mentoring: profits increased by 20%
- Training shows no significant effect
- But effects disappear about a year after the intervention: the mentor-mentee relationship disappears as the incentives provided to the mentors are removed

II.2. Alternative approaches to training

Peer interactions: Cai and Szeidl (2018)

- Organize monthly business meetings for randomly selected groups of managers of Chinese firms
- Sample: 2800 young firms interested in business meetings

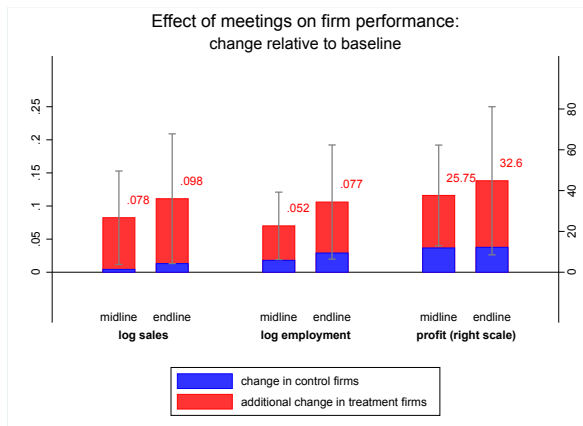## II.2. Alternative approaches: Cai and Szeidl (2018)

Intervention:

- Treatment group: 1480 randomly chosen managers, randomized into business groups with 10 managers each.
  - Each group expected to meet once a month, every month, for a year.
  - Meetings were intensive: managers would typically tour the firm of a group member, and then spend hours discussing business issues.

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- Control group: 1,320 managers, no meetings.
    - They were informed that there was no room in the meetings.
- Both treatment and control firms were offered a government certificate as incentive to attend the meetings and complete our surveys.
    - Valuable because it provides access to government services.

II.2. Alternative approaches: Cai and Szeidl (2018)
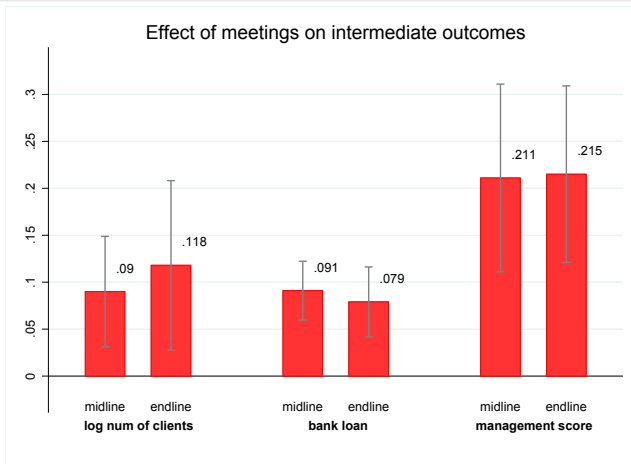
- Surveys:
    - Baseline: 2013 summer, before the intervention.
    - Midline: 2014 summer, after the (1-year) intervention.
    - Endline: 2015 summer.
    - Data on firm characteristics, business networks, and management practices (in midline and endline).
- Additional interventions:
    1. Group composition: we created variation based on size and sector.
    2. Information transmission: Distributed information to random managers about (i) a firm funding (ii) a private savings opportunity.
    3. Meeting frequency: We organized one-time cross-group meetings.

II.2. Alternative approaches: Cai and Szeidl (2018)

Effect of meetings on firm performance: change relative to baseline

- Meetings seem to be beneficial.
- Also positive impacts on total assets and utility cost.

Effect of meetings on intermediate outcomes

- Improved access to partners and credit is a possible channel.
- Surveyed management using questions adapted from Bloom and Van Reenen (2007); standardized and averaged to create an index.
- Participating in meetings improved management skills.

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Mechanisms: learning from peers

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        - A cash grant of up to RMB 200,000.
        - Each year around 150 firms are selected to receive funding.

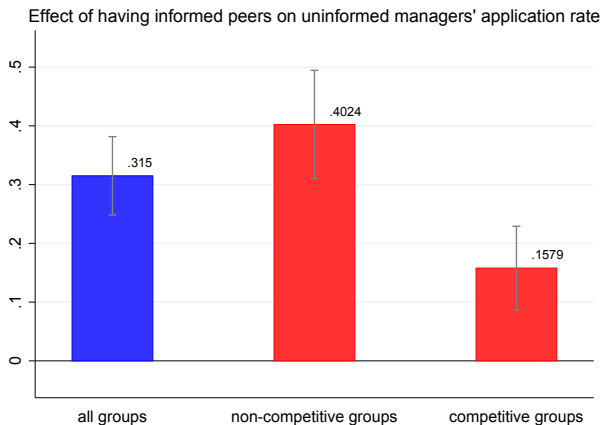**Mechanisms: learning from peers**

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    - Offers an annual return of almost 7%.
    - Also limited in supply, but less saliently so.

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    - Treatment: distributed information to 0%, 50%, or 80% managers within a business group.
    - Control: distributed information to 40% managers.

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- We asked managers who are their competitors in the group.
    - Created an indicator for groups being "competitive" by the median of the group-level average number of competitors.
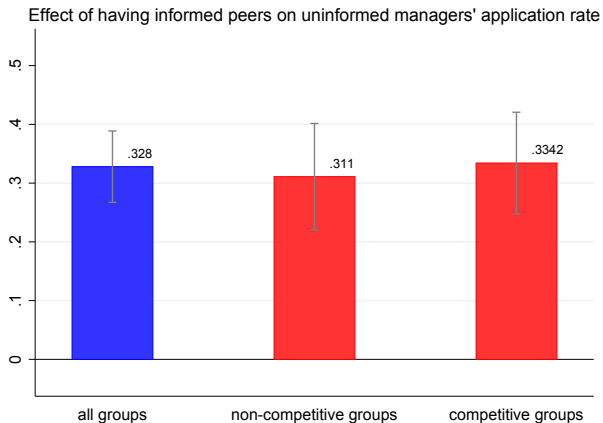
Mechanisms: learning from peers

Effect of having informed peers on uninformed managers' application rate

- Meetings diffused information and helped informed managers apply.
- Diffusion was weaker for managers with many competitors in the group.

Mechanisms: learning from peers

Effect of having informed peers on uninformed managers' application rate

- For less rival private savings product, competition was not significantly related to diffusion.

- Other mechanisms found:
    - Improved access to partners
    - Improved access to finance

Group composition:

- If meetings matter, composition of peers should also affect performance.
    - Internal consistency test.
- We randomized firms into groups based on firm size and sector at the region level.
    - By region we split firms into "small" and "large".
    - By sector we split firms into "manufacturing" and "services".
    - Randomized firms into homogenous/mixed size and sector groups.
- Measure impact of peer firms' average number of employees.

Group composition:

Effect of 10% larger peers on firm performance
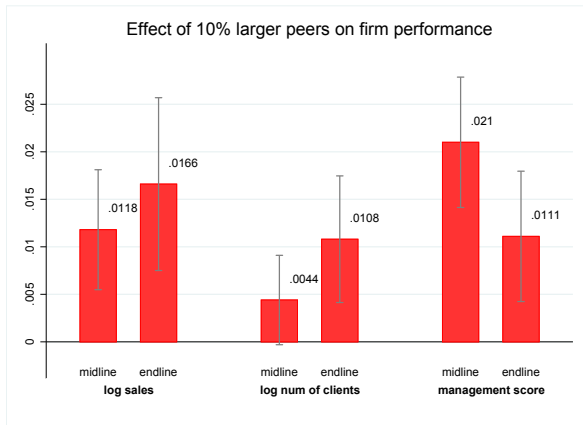
- Conditional on being in the same region, size category and industry category, firms were randomly allocated into groups.
  - Control for *Midline* and *Endline* interacted with these demographics and all their interactions.

- Cost vs benefit: average profit gain 5 times manager's wage cost.
- External validity and policy implications:
  - Selection, peer quality and meeting intensity likely important.
  - Business associations may be effective in contexts with these features.

Summary on peer interactions and menthoring:

- Matching with the right peers is important: more effective when firms are matched with similar but better peers who are not close competitors
- Peer learning may not happen automatically: incentives are needed

II.2. Alternative business training approaches

SMS messages and voice messages:

- Cole et al (2019)
    - Send weekly voice messages with rule-of-thumb in the Philippines and India
    - Find modest improvements in business practices but no significant changes in business performance
- Acimovic et al (2020)
    - Work with mobile money agents in Tanzania, and send daily personalised recommendations on inventory levels
    - Find no impact

II.2. Alternative business training approaches

Online training: Jin and Sun (2021)

- An experiment with over 700,000 sellers on the largest e-commerce platform in China
- One quarter are offered task-based training
- Taking up the training increases sales by 6.6%

Outline

- I. Management
    - I.1. Introduction and measurement
    - I.2. Impact of management on firm outcomes
- II. Business training
    - II.1. Traditional small-business training
    - II.2. Alternative approaches to training
- **III. Summary**

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- What we have learned:
  - Firms (regardless of the size) using better management practices are more productive and grow faster
  - Traditional business trainings has modest but significant effects on improving management and outcomes for small firms, but the effect is quite heterogenous across sample and contexts
  - It's important to innovate the content and delivery methods for training

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- What we have learned:
  - Firms (regardless of the size) using better management practices are more productive and grow faster
  - Traditional business trainings has modest but significant effects on improving management and outcomes for small firms, but the effect is quite heterogenous across sample and contexts
  - It's important to innovate the content and delivery methods for training
- Open questions:
  - How to improve the targeting of training?
  - How do we improve the cost-effectiveness of training?
  - Why firms do not adopt beneficial business practices even after training?
  - How do we make markets for training work better?